CLAIMS

What is claimed is:

1. A method for designing a waveguide, the method comprising:

   establishing a design metric;

   dividing the waveguide into two or more sections;

   setting initial design values; and

   modifying the values for each section in accordance with the design metric.

2. The method of claim 1, further comprising concatenating the sections together.

3. The method of claim 2, further smoothing the sections that are concatenated together.

4. The method of claim 1, where the design metric is the change in acoustic reactance between the sections of the waveguide.

5. The method of claim 1, where the design metric is the change in acoustic resistance between the sections of the waveguide.

6. The method of claim 1, where the design metric is the minimum change in acoustic resistance between the sections of the waveguide.

7. The method of claim 1, where waveguide is a transducer diaphragm.

8. The method of claim 7, where the design metric is the change in acoustic impedance measured between the sections of transducer diaphragm.

9. The method of claim 1, where the waveguide is divided into five sections.

10. The method of claim 1, where the waveguide is divided into ten sections.

11. The method of claim 1, where the waveguide has a throat and a mouth and where the initial design values are dimensions of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

12. The method of claim 8, where the initial slopes of the waveguide along major and minor axis are modified in accordance with the design metrics.

13. The method of claim 9, where the slopes of each section of the waveguide are modified in accordance with the design metric.

14. The method of claim 1, where the waveguide is a port tube.

15. The method of claim 1 where the waveguide is designed for the use in connection with a loudspeaker.

16. The method of claim 1 where the waveguide is designed for use in a radar application.

17. The method of claim 1 where the waveguide is designed for use in a communications application.

18. A method for designing a waveguide, the method comprising:

developing an initial waveguide profile with two or more different exponential slopes concatenated together;

modifying the slopes based upon a design metric; and

smoothing the modified slopes based upon a polynomial order curve fit.

19. The method of claim 18, where the design metric is the change in acoustic reactance between the sections of the waveguide.

20. The method of claim 18, where the design metric is the change in acoustic resistance between the sections of the waveguide.

21. The method of claim 18, where the design metric is the minimum change in acoustic resistance between the sections of the waveguide.

22. The method of claim 18, where waveguide is a transducer diaphragm.

23. The method of claim 18, where the design metric is the change in acoustic impedance measured between the sections of transducer diaphragm.

24. The method of claim 18, where the waveguide is divided into five sections.

25. The method of claim 18, where the waveguide is divided into ten sections.

26. The method of claim 18, where the waveguide has a throat and a mouth and where the initial waveguide profiles with two or more different exponential slopes concatenated together are designed by using initial design values.

27. The method of claim 26, where the initial design values are the size of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

28. The method of claim 18, where the waveguide is a port tube.

29. The method of claim 18 where the waveguide is designed for the use in connection with a loudspeaker.

30. The method of claim 18 where the waveguide is designed for use in a radar application.

31. The method of claim 18 where the waveguide is designed for use in a communications application.

32. A method for designing a waveguide for use in connection with a loudspeaker, the method comprising:

developing an initial waveguide profile with two or more different exponential slopes concatenated together by using initial design values for the waveguide;

modifying the concatenated slopes of the waveguide using the minimum change in acoustic resistance between the sections of the waveguide; and

smoothing the modified slopes based upon a polynomial order curve fit.

33. The method of claim 32, where waveguide is a transducer diaphragm.

34. The method of claim 32, where the waveguide is divided into five sections.

35. The method of claim 32, where the waveguide is divided into ten sections.

36. The method of claim 32, where the initial design values are the size of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

37. The method of claim 32, where the waveguide is a port tube.

38. A method for designing a waveguide for use in connection with a loudspeaker, the method comprising:

developing an initial waveguide profile with two or more different exponential slopes concatenated together by using initial design values for the waveguide;

modifying the concatenated slopes of the waveguide using the change in acoustic resistance between the sections of the waveguide; and

smoothing the modified slopes based upon a polynomial order curve fit.

39. The method of claim 38, where waveguide is a transducer diaphragm.

40. The method of claim 38, where the waveguide is divided into five sections.

41. The method of claim 38, where the waveguide is divided into ten sections.

42. The method of claim 38, where the initial design values are the size of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

43. The method of claim 38, where the waveguide is a port tube.

44. A signal-bearing medium having software for designing a waveguide, the signal-bearing medium comprising:

logic configured for establishing a design metric;

logic configured for dividing the waveguide into two or more sections;

logic configured for setting initial design values; and

logic configured for modifying the values for each section in accordance with the design metric.

45. The signal-bearing medium of claim 44, further comprising logic configured for concatenating the sections together.

46. The signal-bearing medium of claim 45, further comprising logic configured for smoothing the sections that are concatenated together.

47. The signal-bearing medium of claim 44, where the design metric is the change in acoustic reactance between the sections of the waveguide.

48. The signal-bearing medium of claim 44, where the design metric is the change in acoustic resistance between the sections of the waveguide.

49. The signal-bearing medium of claim 44, where the design metric is the minimum change in acoustic resistance between the sections of the waveguide.

50. The signal-bearing medium of claim 44, where waveguide is a transducer diaphragm.

51. The signal-bearing medium of claim 50, where the design metric is the change in acoustic impedance measured between the sections of transducer diaphragm.

52. The signal-bearing medium of claim 44, where the waveguide is divided into five sections.

53. The signal-bearing medium of claim 44, where the waveguide is divided into ten sections.

54. The signal-bearing medium of claim 44, where the waveguide has a throat and a mouth and where the initial design values are dimensions of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

55. The signal-bearing medium of claim 51, where the initial slopes of the waveguide along major and minor axis are modified in accordance with the design metrics.

56. The signal-bearing medium of claim 52, where the slopes of each section of the waveguide are modified in accordance with the design metric.

57. The signal-bearing medium of claim 44, where the waveguide is a port tube.

58. The signal-bearing medium of claim 44, where the waveguide is designed for the use in connection with a loudspeaker.

59. The signal-bearing medium of claim 44, where the waveguide is designed for use in a radar application.

60. The signal-bearing medium of claim 44, where the waveguide is designed for use in a communications application.

61. A signal-bearing medium having software for designing a waveguide, the signal-bearing medium comprising: /

logic configured for developing an initial waveguide profile with two or more different exponential slopes concatenated together;

logic configured for modifying the slopes based upon a design metric; and

logic configured for smoothing the modified slopes based upon a polynomial order curve fit.

62. The signal-bearing medium of claim 61, where the design metric is the change in acoustic reactance between the sections of the waveguide.

63. The signal-bearing medium of claim 61, where the design metric is the change in acoustic resistance between the sections of the waveguide.

64. The signal-bearing medium of claim 61, where the design metric is the minimum change in acoustic resistance between the sections of the waveguide.

65. The signal-bearing medium of claim 61, where waveguide is a transducer diaphragm.

66. The signal-bearing medium of claim 61, where the design metric is the change in acoustic impedance measured between the sections of transducer diaphragm.

67. The signal-bearing medium of claim 61, where the waveguide is divided into five sections.

68. The signal-bearing medium of claim 61, where the waveguide is divided into ten sections.

69. The signal-bearing medium of claim 61, where the waveguide has a throat and a mouth and where the initial waveguide profiles with two or more different exponential slopes concatenated together are designed by using initial design values.

70. The signal-bearing medium of claim 69, where the initial design values are the size of the throat and the initial slopes of the waveguide on the major and minor axis of the waveguide.

71. The signal-bearing medium of claim 61, where the waveguide is a port tube.

72. The signal-bearing medium of claim 61 where the waveguide is designed for the use in connection with a loudspeaker.